Hungry for Change
Urban Bias and Autocratic Default

Cameron Ballard-Rosa
Department of Political Science
Yale University

International Political Economy Society – October 26, 2013
Motivation

Why do countries default on their sovereign debt?

- Argument of broader project: Political incentives for default vary under different political institutions.
- Focus of this paper: Why do autocracies default?
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Previous work on debt default

**Macroeconomic theories of default:**

**Political/institutional theories of default:**
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My theory:

- A primary threat to autocratic survival comes from the ability of the masses to threaten revolt.
- This should be easier in urban areas.
- Autocrats should therefore pursue urban-biased policies, especially cheap food policies.
- Cheap food is costly.
- Food subsidies are also a common target of reform during times of fiscal crisis.
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Collective mobilization and urban bias

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Testable hypotheses

Model provides two main comparative statics of interest:

- Fiscal burden of food subsidies is greatest in food importing autocracies.
- H1: Autocracies that import more food will be more likely to default on their sovereign debt.
- Larger urban populations increase the likelihood of succeeding in regime opposition.
- H2: Autocracies with larger urban populations will be more likely to default on their sovereign debt.
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Data & Estimation

- **DV:** *year in default* for 42 autocracies, 1960-2009.

- Main explanatory variables:
  - *urbanization* (as percent of total population).
  - *food import costs*, scaled by GDP.

- Baseline controls (*GDP per capita, Δ GDP, debt/GDP, inflation, trade*).

- Full controls (*crisis year, imports/GDP, exports/GDP, logged population, oil rents per capita, foreign reserves, agricultural share of the economy, food X urban*).

- Estimating model (probit):
  \[ \text{default}_{it} = \beta_1 \text{food}_{it-1} + \beta_2 \text{urban}_{it-1} + \gamma X_{it-1} + \eta_i + \theta_t + \epsilon_{it} \]

- Multiple imputation estimates.

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  \]
- Multiple imputation estimates.
Autocratic cross-tabs

Proportion of autocratic years in default, by food imports

- Low food importer: 0.16
- High food importer: 0.24

Proportion of autocratic years in default, by urbanization

- Low urbanization: 0.08
- High urbanization: 0.25
### Empirical Results I: Baseline Specifications

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1) Probit</th>
<th>(2) Probit</th>
<th>(3) Probit</th>
<th>(4) Probit</th>
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<tbody>
<tr>
<td>Food imports</td>
<td>27.095***</td>
<td>22.895***</td>
<td>69.938***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(8.123)</td>
<td>(9.807)</td>
<td>(26.317)</td>
<td></td>
</tr>
<tr>
<td>Urbanization (% total pop.)</td>
<td>0.075**</td>
<td>0.106**</td>
<td>0.156**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.034)</td>
<td>(0.047)</td>
<td>(0.069)</td>
<td></td>
</tr>
<tr>
<td>Baseline controls</td>
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<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Full controls</td>
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<td>No</td>
<td>No</td>
<td>Yes</td>
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<td>995</td>
<td>995</td>
<td>995</td>
</tr>
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<td>Number of countries</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
</tr>
</tbody>
</table>

*** p<0.01, ** p<0.05, * p<0.1
**Robustness checks**

1. **Instrumental Variables** (use world food commodity prices).
2. Different estimating models (OLS, logit, RE probit, conditional logit).
3. Alternative dependent variable (default instance).
4. Scale food imports by population, not GDP.
5. Placebo #1 (effect of food imports and urbanization on other types of economic crisis).
7. Additional covariate profiles (domestic conflict, military expenditure, major power alliance, etc.).
8. Linear (or quadratic) time term.
10. Additive tally of parallel economic crises, or use prime component from factor analysis.
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Contributions:

- Provides novel political theory of autocratic sovereign debt default.
- Adds two robust predictors of autocratic default that had been previously ignored.
- Emphasizes the importance of urban-rural conflict in explaining international outcomes.

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- What about democracies? (see Ballard-Rosa 2013)
Thanks!

Thank you!
Democratic cross-tabs

Proportion of democratic years in default, by food exports

Proportion of democratic years in default, by rurality
### What about democracies?

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Democratic default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food imports</td>
<td>-8.497</td>
</tr>
<tr>
<td></td>
<td>(39.037)</td>
</tr>
<tr>
<td>Urbanization (% total pop.)</td>
<td>-0.1***</td>
</tr>
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<td></td>
<td>(0.042)</td>
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</table>

Baseline controls: Yes
Full controls: Yes
Observations: 738
Number of countries: 26

*** p<0.01, ** p<0.05, * p<0.1
### Food trade and democratic default

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1) Bivar. $X$</th>
<th>(2) Baseline $X$</th>
<th>(3) Polit. $X$</th>
<th>(4) Bivar. $M$</th>
<th>(5) Baseline $M$</th>
<th>(6) Polit. $M$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural pop.</td>
<td>0.013***</td>
<td>0.015***</td>
<td>0.017***</td>
<td>-0.0006163</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.006)</td>
<td>(0.007)</td>
<td>(0.002)</td>
<td>(0.003)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>Baseline controls</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Political controls</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
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<td>Observations</td>
<td>1,055</td>
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<tr>
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<td>41</td>
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<td>34</td>
<td>34</td>
<td>34</td>
</tr>
</tbody>
</table>

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The Model – Actors

- Autocrat A, Urban citizens U, and Rural citizens R.
- Urban citizens form proportion $\alpha$ of total population; each produces $\bar{x}$ units of (non-food) good.
- Rural citizens form proportion $(1 - \alpha)$ of total population; each produces $\bar{b}$ units of food.
- Utility for citizen $i$: $u_i(b, x) = x + \ln(b)$
- Hunger threshold: If urban citizens do not consume at least $\tilde{b}$ units of food, they will engage in regime opposition $\omega \in \{0, 1\}$, which is successful in overthrowing the autocrat with probability $v(\alpha)$. 
The Model – Autocrat

- Autocrat chooses food subsidy $\phi \in [0, \pi)$ such that domestic price of $b$ is $p = \pi - \phi$.
- Autocrat can also choose to default $\delta \in \{0, 1\}$, but at a cost of losing access to future loans $l$.
- Government budget constraint: $\gamma - (1 - \delta)d \geq C(\phi)$
- Utility for autocrat: $u_A(\delta) = \chi + (1 - \delta)\rho l$
The Model – Timing

1. Nature draws a world price of food $\pi \sim F(\pi)$.
2. The autocrat chooses to default ($\delta \in \{0, 1\}$) and selects a food subsidy ($\phi \in [0, \pi]$).
3. If urban consumers cannot consume at least $\tilde{b}$ units of bread, they engage in regime opposition that is successful with probability $v(\alpha)$; otherwise, they do nothing ($\omega \in \{0, 1\}$).
4. Payoffs accrue.
Define $\tilde{\phi}(\alpha)$ as subsidy level where urban food consumption equals $\tilde{b}$.

Default occurs in equilibrium iff:

1. $\gamma - d < C(\tilde{\phi}(\alpha))$  
   [Fiscal constraint]

2. $\chi \geq \frac{\rho l(1 - v(\alpha))}{v(\alpha)}$  
   [Incentive compatibility constraint]
But what if food imports are endogenous?

- Need instrument that is related to debt default only through its effect on food import costs.
- **Answer**: World food commodity prices.
  - No single country likely to have strong market power (exogenous).
  - Importers must pay world market price for their imports (not weak IV).
  - Should not otherwise be correlated with debt default (exclusion restriction).

- Used six common commodities: wheat, maize, rice, soybean oil, sugar, chicken.
### IV Results

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Full controls</th>
</tr>
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<tbody>
<tr>
<td>Food imports</td>
<td>82.12***</td>
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<td>(24.223)</td>
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<tr>
<td>Urbanization (% total pop.)</td>
<td>0.086*</td>
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<td>Wheat imports x Price</td>
<td>2.08e-05*</td>
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<tr>
<td></td>
<td>(1.19e-05)</td>
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<tr>
<td>Rice imports x Price</td>
<td>5.52e-06*</td>
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<tr>
<td></td>
<td>(3.20e-06)</td>
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<tr>
<td>Maize imports x Price</td>
<td>-2.93e-07</td>
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<tr>
<td></td>
<td>(1.07e-05)</td>
</tr>
<tr>
<td>Chicken imports x Price</td>
<td>5.85e-05*</td>
</tr>
<tr>
<td></td>
<td>(3.46e-05)</td>
</tr>
<tr>
<td>Soybean oil imports x Price</td>
<td>4.89e-06**</td>
</tr>
<tr>
<td></td>
<td>(2.24e-06)</td>
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<tr>
<td>Sugar imports x Price</td>
<td>4.79e-05*</td>
</tr>
<tr>
<td></td>
<td>(2.89e-05)</td>
</tr>
<tr>
<td>Kleibergen-Paap rK stat</td>
<td>17.31**</td>
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<tr>
<td>Hansen J stat</td>
<td>1.657</td>
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<td>Observations</td>
<td>995</td>
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## Reduced form for IV

<table>
<thead>
<tr>
<th>VARIABLES</th>
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<td>wheatXprice</td>
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<tr>
<td></td>
<td>(0.002)</td>
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<tr>
<td>chickenXprice</td>
<td>0.006***</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
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<tr>
<td>soybeanoilXprice</td>
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<td>maizeXprice</td>
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<td>(0.002)</td>
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</tbody>
</table>

Full controls: Yes
Observations: 1,229
Number of countries: 43

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# Empirical Results II: Other Robustness Checks

<table>
<thead>
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<th>(1) OLS</th>
<th>(2) Cond. Logit</th>
<th>(3) Lagged DV</th>
<th>(4) Alt. DV</th>
<th>(5) Food/pop.</th>
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<tr>
<td>Food imports</td>
<td>7.167*</td>
<td>106.249***</td>
<td>15.535*</td>
<td>117.795***</td>
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<td></td>
<td>(3.842)</td>
<td>(35.918)</td>
<td>(8.79)</td>
<td>(38.701)</td>
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<tr>
<td>Urbanization (% total pop.)</td>
<td>0.017***</td>
<td>0.238***</td>
<td>0.023***</td>
<td>0.219***</td>
<td>0.119**</td>
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<td></td>
<td>0.006</td>
<td>0.082</td>
<td>0.008</td>
<td>0.089</td>
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<tr>
<td>Food imports/pop.</td>
<td>.0000436*</td>
<td>.0000254</td>
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<tr>
<td>Full controls</td>
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<td>Observations</td>
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<td>995</td>
<td>405</td>
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*** p<0.01, ** p<0.05, * p<0.1
### Empirical Results III: Placebo Tests

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<td>Food imports</td>
<td>-14.428</td>
<td>0.108</td>
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<td>(19.031)</td>
<td>(20.213)</td>
<td>(28.293)</td>
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<td>Urbanization (% total pop.)</td>
<td>0.019</td>
<td>0.028</td>
<td>0.103*</td>
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<td>(0.045)</td>
<td>(0.049)</td>
<td>(0.054)</td>
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<td>Baseline controls</td>
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<td>Yes</td>
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*** p<0.01, ** p<0.05, * p<0.1
### Empirical Results IV: Other import types

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<th>(1) Manuf.</th>
<th>(2) Arms</th>
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<td>Manuf. imports</td>
<td>-4.69*</td>
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<td>(2.594)</td>
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<td>Arms imports</td>
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<td></td>
<td></td>
<td>(3.272)</td>
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<td>Fuel imports</td>
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<td></td>
<td>13.942*</td>
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<td>(7.581)</td>
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<td>Urbanization (% total pop.)</td>
<td>0.103***</td>
<td>0.106***</td>
<td>0.101***</td>
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<td>0.041</td>
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*** p<0.01, ** p<0.05, * p<0.1
Effect of increased food imports on autocratic default

Predicted probability:
Effect of increased food imports on autocratic default

Marginal effect:
Food imports interacted with urbanization

Predicted probability:

![Graph showing predicted probability vs urbaxis]
Food imports interacted with urbanization

Marginal effect:
Appendix

Democratic default

The Model

Other output tables

Current standing

Macroeconomics of default:

- “A systematic analysis of the relationship between sovereign debt, defaults, and political career concerns has not been undertaken and is an interesting area for future research.” Sturznenegger & Zettelmeyer (2009)

Institutional theories of default:

- “Given that the choice between default and repayment is partly political, how do the preferences of voters and interest groups matter, and what role do political institutions play in determining whether sovereigns repay? We suspect these questions will become major foci in the literature, and will offer new opportunities for collaboration across the social sciences.” Tomz & Wright (2013)
### Table 2.1 Variables and Samples Used in Selected Empirical Studies on Determinants of Sovereign Default

<table>
<thead>
<tr>
<th>Reference</th>
<th>Variables</th>
<th>Sample</th>
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<tr>
<td>Detragiache and Spilimbergo (2001)</td>
<td>Short-term debt</td>
<td>Concessional share of debt</td>
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<td>Debt coming due</td>
<td>Multilateral share of debt</td>
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<td></td>
<td>Foreign exchange reserves</td>
<td>Interest rates</td>
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<td></td>
<td>Total debt to GDP ratio</td>
<td>Overvaluation</td>
</tr>
<tr>
<td></td>
<td>Commercial share</td>
<td>Openness</td>
</tr>
<tr>
<td></td>
<td>Real interest rate on U.S. bonds</td>
<td>Foreign exchange reserves to debt ratio</td>
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<tr>
<td></td>
<td>Government balance over GDP</td>
<td>Openness</td>
</tr>
<tr>
<td></td>
<td>Real effective exchange rate</td>
<td>Volatility of fiscal policy</td>
</tr>
<tr>
<td></td>
<td>Short-term debt</td>
<td>Volatility of terms of trade</td>
</tr>
<tr>
<td></td>
<td>Foreign exchange control index</td>
<td>Volatility of money base coverage</td>
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<td></td>
<td>Real GDP growth</td>
<td>Volatility of capital control</td>
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<td></td>
<td>GDP growth</td>
<td>Debt to exports</td>
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(continued next page)
<table>
<thead>
<tr>
<th>Reference</th>
<th>Variables</th>
<th>Sample</th>
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<tr>
<td>Change in growth rate of</td>
<td>Long-term debt service</td>
<td>Data on 94 crisis episodes in low-income countries, 1970–2001</td>
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<td>terms of trade</td>
<td>to reserves ratio</td>
<td></td>
</tr>
<tr>
<td>Export growth</td>
<td>Long-term debt service</td>
<td></td>
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<tr>
<td></td>
<td>to GDP ratio</td>
<td></td>
</tr>
<tr>
<td>U.S. three-month interest</td>
<td>Short-term debt to reserves ratio</td>
<td></td>
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<tr>
<td>rate</td>
<td></td>
<td></td>
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<tr>
<td>Foreign debt to GDP ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kraay and Nehru (2006)</td>
<td>Present value of debt to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>exports ratio</td>
<td></td>
</tr>
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<td></td>
<td>Rule of law</td>
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<tr>
<td>Debt service to revenues</td>
<td>Depreciation</td>
<td></td>
</tr>
<tr>
<td>ratio</td>
<td>Terms of trade growth</td>
<td></td>
</tr>
<tr>
<td>Debt service to reserves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ratio</td>
<td></td>
<td></td>
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<tr>
<td>CPIA rating</td>
<td>GDP per capita</td>
<td></td>
</tr>
<tr>
<td>GDP growth</td>
<td>Inflation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short-term debt over reserves ratio</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tomz and Wright (2007)</td>
<td>Overvaluation</td>
<td>Annual data on 106 countries, 1820–2004</td>
</tr>
<tr>
<td></td>
<td>Total debt to GDP ratio</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GDP (Hodrick-Prescott filtered)</td>
<td></td>
</tr>
</tbody>
</table>

*Source: Authors’ compilation.*

*Note: CPIA = Country Policy and Institutional Assessment (World Bank).*
### Table A.2  Summary statistics for democracies

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Source</th>
<th>Mean</th>
<th>Median</th>
<th>Max.</th>
<th>Min.</th>
<th>Std. dev.</th>
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<tbody>
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<td>BCRIS</td>
<td>Systemic and borderline banking crises</td>
<td>Glick and Hutchison + Caprio and Klingebiel</td>
<td>0.25</td>
<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
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<td>CAGNP</td>
<td>Current accounts/GNP</td>
<td>MRS</td>
<td>−3.54</td>
<td>−3.46</td>
<td>33.88</td>
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<td>CCRIS</td>
<td>Currency crisis</td>
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<td>0.00</td>
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<td>CHECKS</td>
<td>Checks and balances</td>
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<td>3.00</td>
<td>18.00</td>
<td>1.00</td>
<td>1.83</td>
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<td>CORRUPT</td>
<td>Control of corruption</td>
<td>ICRG merged with TI</td>
<td>2.61</td>
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<td>6.00</td>
<td>0.00</td>
<td>1.08</td>
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<td>DEBTLOCAL</td>
<td>Default on local currency debt</td>
<td>S&amp;P, own calculations</td>
<td>0.13</td>
<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
<td>0.34</td>
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<td>DEBTSP</td>
<td>Default on foreign currency debt</td>
<td>S&amp;P</td>
<td>0.26</td>
<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
<td>0.44</td>
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<td>DEMOCRACY</td>
<td>Average of 2 indexes</td>
<td>Gaul</td>
<td>2.93</td>
<td>3.00</td>
<td>4.50</td>
<td>1.00</td>
<td>1.63</td>
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<td>DNONOIL</td>
<td>Non-oil producers</td>
<td>MRS</td>
<td>0.92</td>
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<td>1.00</td>
<td>0.00</td>
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<td>DSX</td>
<td>Debt service/exports (%)</td>
<td>GDF</td>
<td>21.27</td>
<td>18.67</td>
<td>181.60</td>
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<td>GX</td>
<td>Export growth (%)</td>
<td>GDF</td>
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<td>204.05</td>
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<td>Inflation (%)</td>
<td>IFS</td>
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<td>LIBOR</td>
<td>Libor (%)</td>
<td>MRS</td>
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<td>7.63</td>
<td>17.06</td>
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<td>M2VR</td>
<td>M2/reserves</td>
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<td>9.90</td>
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<td>348.01</td>
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<td>OBY</td>
<td>Overall fiscal balance/GDP (%)</td>
<td>MRS</td>
<td>−4.43</td>
<td>−3.71</td>
<td>19.42</td>
<td>−48.78</td>
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<td>ODTD</td>
<td>Official debt/total debt (%)</td>
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<td>46.26</td>
<td>44.05</td>
<td>99.93</td>
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<td>OPEN</td>
<td>(imports + exports)/GDP (%)</td>
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<td>78.33</td>
<td>67.31</td>
<td>436.35</td>
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<td>Parliamentary elections</td>
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<td>0.43</td>
<td>0.86</td>
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<td>PEACE</td>
<td>No war</td>
<td>Nils et al.</td>
<td>0.77</td>
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### Table A.2 (Continued)

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<td>Polarization of government</td>
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<td>Government revenue/GNP</td>
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<td>Percent of veto players who leave government</td>
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<td>STATE</td>
<td>Ranges from 0-2 depending on whether Provincial executive and/or legislature are locally elected</td>
<td>DPI</td>
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<td>0.00</td>
<td>0.8</td>
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<td>Short-term debt/reserves</td>
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<td>47.84</td>
<td>249.28</td>
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<td>39.59</td>
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<td>Total external debt/exports (%)</td>
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<td>16.86</td>
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<td>6.93</td>
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<td>2.00</td>
<td>39.00</td>
<td>1.00</td>
<td>3.38</td>
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<td>3-months US Treasury bill rate</td>
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<td>6.35</td>
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<td>14.08</td>
<td>3.02</td>
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<td>Remaining terms of chief executive</td>
<td>DPI</td>
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<td>7.00</td>
<td>1.00</td>
<td>1.43</td>
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<td>YRSOPFC</td>
<td>Years in office of chief executive</td>
<td>DPI</td>
<td>5.28</td>
<td>3.00</td>
<td>46.00</td>
<td>1.00</td>
<td>6.54</td>
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<tr>
<td>YSPAE</td>
<td>Years since parliamentary elections</td>
<td>MRS</td>
<td>1.93</td>
<td>2.00</td>
<td>15.00</td>
<td>0.00</td>
<td>2.09</td>
</tr>
</tbody>
</table>

Hungry for Change
Background to Zambian default

- **Why Zambia?**
  - Single-party state since independence in 1964 under Kenneth Kaunda & UNIP.
  - Undergoes rapid urbanization; second-highest rate of urbanization in sub-Saharan Africa.

- **NAMBOARD**
  - Monopolizes line-of-rail access for rural producers.
  - Monopolizes imports of several critical food commodities.

- Government heavily subsidizes basic commodities, especially maize.

- In some years, maize subsidy consumes 15% of government budget.
Fiscal crisis

- Mid-1970s: Drop in copper prices leads to fiscal crisis for Zambian government.
- Macroeconomic imbalance is considered temporary for several years.
- Government finally turns to IMF for emergency loans.
- One of the primary policy demands from IMF is elimination of food subsidies.
December 1986: Government attempts to remove maize subsidy; maize prices skyrocket.

Protests against food policy erupt around the country, especially in heavily-urbanized “Copper Belt” and Lusaka.

This occurs during lead-up to (single-party) elections; perceived by government as regime threatening.

Kaunda “badly shaken;” government reimposes price subsidies and protests subside.

May Day, 1987: Kaunda delivers national address announcing unilateral termination of debt negotiations with international financial institutions; limits debt repayments to 10% of foreign reserves earnings.
Overimputation

Observed versus Imputed Values of foodimp_gdp

Cameron Ballard-Rosa  Hungry for Change
Overdispersion

Overdispersed Start Values

Convergence of original starting values